

.:8 LED Fun:. .:Multiple LEDs:.



WHAT WE'RE DOING:

We have caused one LED to blink, now it's time to up the stakes. Lets connect eight. We'll also have an opportunity to stretch the Arduino a bit by creating various lighting sequences. This circuit is also a nice setup to experiment with writing your own programs and getting a feel for how the Arduino works.

Along with controlling the LEDs we start looking into a few simple programming methods to keep your programs small.

for() loops - used when you want to run a piece of code several times.

arrays[] - used to make managing variables easier (it's a group of variables).

THE CIRCUIT:

Parts:



**CIRC-02
Breadboard Sheet
x1**



**2 Pin Header
x4**



**5mm Green LED
x8**

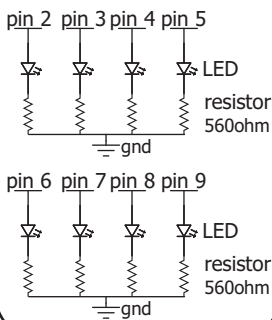


Wire



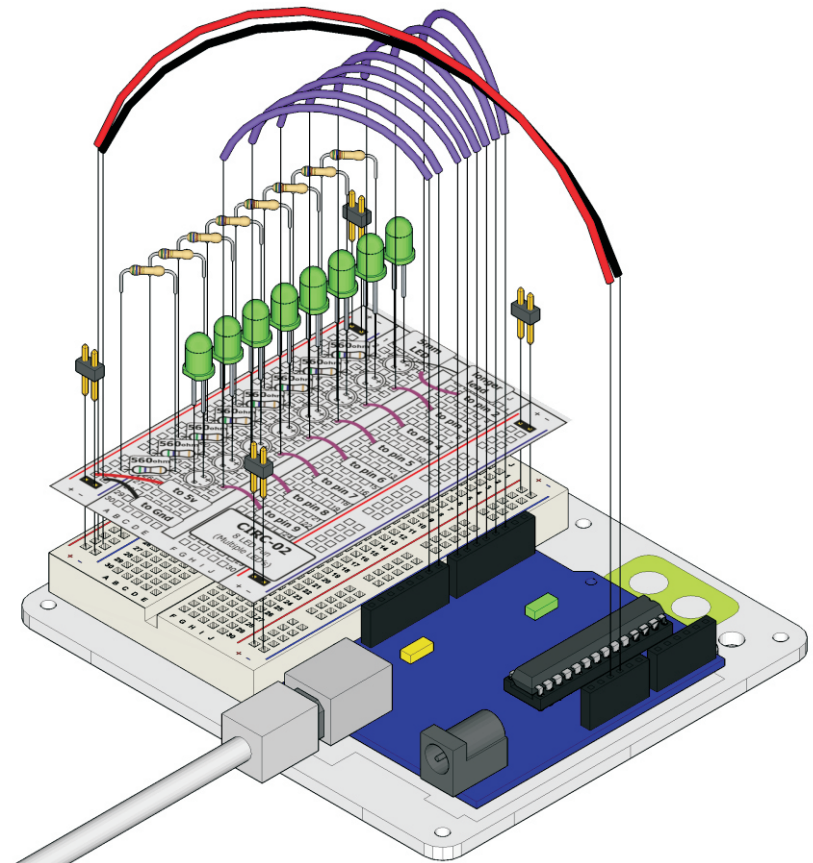
**560 Ohm Resistor
Green-Blue-Brown
x8**

Schematic



The Internet

..download..
breadboard layout sheet
<http://ardx.org/BBL502>
..view..
assembly video
<http://ardx.org/VIDE02>



CODE (no need to type everything in just click)**Download the Code from (<http://ardx.org/CODE02>)**

(and then copy the text and paste it into an empty Arduino Sketch)

```
//LED Pin Variables
int ledPins[] = {2,3,4,5,6,7,8,9};
//An array to hold the
//pin each LED is connected to
//i.e. LED #0 is connected to pin 2

void setup()
{
  for(int i = 0; i < 8; i++){
    //this is a loop and will repeat eight times
    pinMode(ledPins[i],OUTPUT);
    //we use this to set LED pins to output
  }
}

void loop()                // run over and over again
{
  oneAfterAnotherNoLoop();
  //this will turn on each LED one by
  //one then turn each one off
  //oneAfterAnotherLoop();
  //this does the same as onAfterAnotherNoLoop
  //but with much less typing
  //oneOnAtATime();
  //inAndOut();
}

/*
 * oneAfterAnotherNoLoop() - Will light one then
 * delay for delayTime then light the next LED it
 * will then turn them off

void oneAfterAnotherNoLoop(){
  int delayTime = 100;
  //the time (in milliseconds) to pause
  //between LEDs
  digitalWrite(ledPins[0], HIGH); //Turns on LED #0
  //connected to pin 2
  delay(delayTime); //waits delayTime milliseconds
  ...
  digitalWrite(ledPins[7], HIGH); //Turns on LED #7
  //(connected to pin 9)
  delay(delayTime); //waits delayTime milliseconds
  //Turns Each LED Off
  digitalWrite(ledPins[7], LOW); //Turns off LED #7
  delay(delayTime); //waits delayTime milliseconds
  ...

  -----more code in the downloadable version-----
```

NOT WORKING? (3 things to try)**Some LEDs Fail to Light**

It is easy to insert an LED backwards. Check the LEDs that aren't working and ensure they the right way around.

Operating out of sequence

With eight wires it's easy to cross a couple. Double check that the first LED is plugged into pin 2 and each pin there after.

Starting Afresh

Its easy to accidentally misplace a wire without noticing. Pulling everything out and starting with a fresh slate is often easier than trying to track down the problem.

MAKING IT BETTER**Switching to loops:**

In the loop() function there are 4 lines. The last three all start with a '//'. This means the line is treated as a comment (not run). To switch the program to use loops change the void loop() code to:

```
//oneAfterAnotherNoLoop();
oneAfterAnotherLoop();
//oneOnAtATime();
//inAndOut();
```

Upload the program, and notice that nothing has changed. You can take a look at the two functions, each does the same thing, but use different approaches (hint: the second one uses a for loop).

Extra animations:

Tired of this animation? Then try the other two sample animations. Uncomment their lines and upload the program to your board and enjoy the new light animations. (delete the slashes in front of row 3 and then 4)

Testing out your own animations:

Jump into the included code and start changing things. The main point is to turn an LED on use digitalWrite(pinNumber, HIGH); then to turn it off use digitalWrite(pinNumber, LOW); . Type away, regardless of what you change you won't break anything.

MORE, MORE, MORE:

More details, where to buy more parts, where to ask more questions:

<http://ardx.org/CIRC02>